BALANCING COST AND QUALITY: METHODS OF EVALUATION*

LOUISE B. RUSSELL, PH.D.
Senior Fellow
The Brookings Institution
Washington, D.C.

THE title of this panel, Balancing Cost and Quality, succinctly describes the fundamental dilemma of cost containment. The dilemma is that doing all, or even most, of the good things possible in medical care entails the kind of growth in expenditures experienced during the last 20 years, but slowing the growth of expenditures means going without some of those good things. Containing costs means giving up at least a little quality. It is an unpleasant but unavoidable dilemma. And as medical expenditures have pressed harder on personal, corporate and government budgets, the nation has reluctantly moved to slow their growth.

The dominant question for health care providers and consumers is thus shifting from "How can we get more resources?" to "How can we get the most health for the resources available?" The goal is, as it always has been, to provide as many people as possible good health for as long as possible. But what is possible is clearly constrained by the nation's growing reluctance to continue diverting resources from other uses.

The change is having a profound effect on investments in health. The major effect comes from the slowdown in the growth of resources available to medical care. The details of how that slowdown is brought about, whether through DRGs, HMOs, PPOs or other mechanisms, are less important. The fundamental change is that resources now lag noticeably behind opportunities to use them. Each new opportunity must be judged more carefully. It is not enough to show that a service or procedure is effective, that is, that it works and improves health. Instead, each service or procedure must bring a reasonably good return in health for the required expenditure.

The standard is comparative, not absolute. The better investments will be kept; those that are less good will be used more selectively or not at all. Cost-

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saving innovations will spread faster than before since they free up resources for other uses. But most innovations are not cost-saving, or are cost-saving in only a few applications. These cost-adding innovations will be slowed in their diffusion to some degree, less if they produce a lot of health for the expenditure, more if they produce relatively little.

An increasing number of articles in the medical literature spell out some of the choices. They have yielded illuminating results. Equally promising, they reflect the enormous development in evaluation methods over the last two decades. The decisions ahead are difficult, but the techniques have been developed that will make the process of sorting through them easier and more accurate. I shall review just a few studies and then sketch the techniques that are available.

Some Studies

The examples extend across the entire spectrum of medical care. Fineberg and his colleagues[1] showed that, for patients with a low probability of myocardial infarction, admission to a coronary-care unit offered only small advantages over an intermediate-care unit and at high cost: $139,000 per year of life saved. With less formal analysis, but a keen sense for the same dilemma, Turnbull and his colleagues[2] reported on the introduction of a tighter admissions policy at the critical care facility of the Memorial Sloan-Kettering Cancer Center. The change, which required consultation between the patient's physician and the attending staff of the unit before a patient could be admitted, was intended to focus resources more precisely on those for whom real improvement was possible.

Bunker and his colleagues[3] published a volume of papers appraising surgical procedures, primarily those for which the indications are imprecise and a matter of some controversy. Many of the procedures considered are quite common and affect hundreds of thousands of people. The editors of the volume note the wide variations across geographic areas in the rate at which a procedure is done. Others observed (and reported) the variations. These authors noted the fact of variation and discussed its implications. These variations carry substantial differences in cost, but it is less clear that higher costs bring substantially better health. To quote the authors: "Thus, nationwide policies of appendectomy for narrow indications or for broad indications differ only slightly in the number of expected lives saved or lost, but the substantial difference in morbidity and hospitalization costs is estimated to amount to several million days of patient hospitalization per year. Simi-

lar arguments can be made about other operations where the indications are marginal." Similar arguments can be made as well about other kinds of medical intervention and recently were, for example, in a paper showing that routine chest roentgenograms rarely had any effect on the treatment given patients in a VA hospital.[4]

In preventive medical care, choices can be equally difficult. In spite of hopes to the contrary, prevention rarely reduces medical expenditures.[5] It almost always involves the same weighing of additional costs against improvements in health as most other choices in medical care. In some cases, such as childhood immunizations, evaluation shows that the investment is an excellent one. In others, such as many screening procedures, the cost per year of healthy life gained is high. Calculations such as these persuaded the American Cancer Society a few years ago to alter its recommendations about the appropriate frequency for some cancer screening tests.[6]

Methods of Evaluation

The balancing of cost and quality is the balancing of cost against health outcomes. Whether the evaluation is formal or informal, this requires some sort of assessment of costs and effects. Methods available to help with these calculations have advanced considerably in the last two decades. It is exciting to realize how great the advances have been. Cost containment means that cost-effectiveness evaluations have become truly valuable for the first time—until cost is accepted as important, cost-effectiveness is irrelevant—and the methods are ready, with some exceptions, to support the kind of work that needs to be done.

One major step in the evolution of cost-effectiveness analysis in health has been its expansion beyond the original and rather narrow use of the term. Originally (and often still) cost-effectiveness was applied in a situation where a specific decision to spend had already been made—to put in a new telephone system or start an intensive care unit, for example. Then the analysis is directed toward finding the least expensive way to make the investment. Hence cost-effectiveness has become equated with cost-saving, with finding the cheapest way to make the investment. But note that the decision itself is not necessarily cost-saving; it would usually be cheaper not to make the investment at all, but the effects have been judged worth the expense at the outset. Further, the decision has been set up so that the effect is much the same—a telephone system or an intensive care unit—and only the costs of achieving it differ. Actually, this statement oversimplifies. The alterna-

tives rarely produce exactly the same result, but the results are close enough that differences can be handled intuitively or ignored.

Most investments in health (or anything else) differ in effects as well as costs. Evaluation methods must be tailored to fit this more common situation. And it is useful, and intuitively more comfortable and understandable, to represent effects by some measure of health rather than to try to translate them into dollars. Over the last two decades cost-effectiveness analysis has developed to permit the comparison of investments with different effects as well as costs.

Cost-effectiveness must proceed by answering three questions: First, is the medical intervention effective? If not, the analysis need proceed no further. If the measure is effective, the second question is, How much does it cost? Measures that add nothing to costs or that save more than they cost can be accepted without going further; they not only improve health, but free resources for other uses. But most measures add to costs at the same time that they improve health. For these a third question must also be answered: What is the balance of costs and effects? Put another way, does the measure bring a reasonable return in health for the expenditure? In this broader use of the term, to say that a measure is cost-effective means that it is a good investment in health.

Most of the development of cost-effectiveness for health has focused on measuring effectiveness, that is, on health outcomes. This is understandable since effectiveness is extremely important, particularly difficult to measure, and was, until cost containment became a reality, almost the only concern. An important series of methods have been developed for combining information from different sources to arrive at an overall conclusion about the effectiveness of an intervention. It is not possible, and would not make economic sense if it were possible, to mount large, randomized, controlled trials to provide a definitive test of every issue in medical care. At the same time, large amounts of highly imperfect and incomplete information are available about many of these issues. The problem is what sense to make of it all. Methods to synthesize information, especially the methods grouped under the heading meta-analysis, have been developed which give guidelines for reviewing the literature and statistical techniques for calculating the size and significance of average effects.[7] A more recent methodology, developed at Duke University, employs Bayesian techniques and emphasizes the importance of synthesizing information about each link in the causal chain between disease and treatment outcome.[8]

A second series of developments, equally important, have explored how

to measure health outcomes in ways that both capture the effects of very different interventions and allow them to be compared. These methods try to represent health outcomes in terms of a common, objective set of descriptors having to do with ability to function. The Sickness Impact Profile, for example, is based on questions about physical and psychosocial functioning derived from people's descriptions of the effects illness had on them.[9] The quality-adjusted life-year describes levels of physical function and symptom/problem complexes (e.g., a persistent cough).[10] The analysts who developed these approaches have used surveys to develop weights for each descriptor. Thus, health effects can be described in terms both important and readily understandable and that allow improvements in health to be included as well as changes in life expectancy. Further, the results can be aggregated into an equivalent number of healthy years to facilitate comparisons of different interventions.

Costs and their measurement have been taken for granted, in part because economics already provides some guidance as to how to handle them. The economic concept of opportunity cost—the payment necessary to induce the owner of the resource to make it available—is central although not always easy to put into practice in an area such as health where market prices are suspect. There has been progress toward agreeing on the specific costs that should and should not be included.[11] But I think that this part of the methodology needs further attention to bring it up to the standards reached in measuring health outcomes. Costs need to be measured more carefully and completely if cost-effectiveness evaluations are to be reliable guides for decision-making.

The third step is to evaluate the balance between costs and effects. To help with this final step the analyst usually calculates a cost-effectiveness ratio in addition to presenting the estimates of costs and effects in detail. The need here is to continue to standardize the approaches and, where possible, the assumptions made in different studies so that their results can be compared.[12] Comparison is the essence of cost-effectiveness evaluation and, as the method becomes more widely used, it should also become more standardized so that comparisons are easier. Comparing the results for different interventions shows which are more or less cost-effective, that is, which produce additional health at lowest cost.

The final decisions about which investments to make depend, however, on values. The information about costs and effects is essential to good decisions, but the decisions depend on how we as individuals and as a society value the effects, which represent what we get, as against the costs, which

represent what we must give up elsewhere to get those effects. The new methods help to make those values explicit and ensure that they are consistent with our other values, but the decisions must be made by real human beings, by us, not by technical methods.

Nonetheless, the advances that have been made in methods are exciting and impressive. They can be of enormous help in making the decisions that lie ahead. With their help we shall do a better job of balancing cost and quality in medical care.

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